

(No Model.)

2 Sheets—Sheet 1.

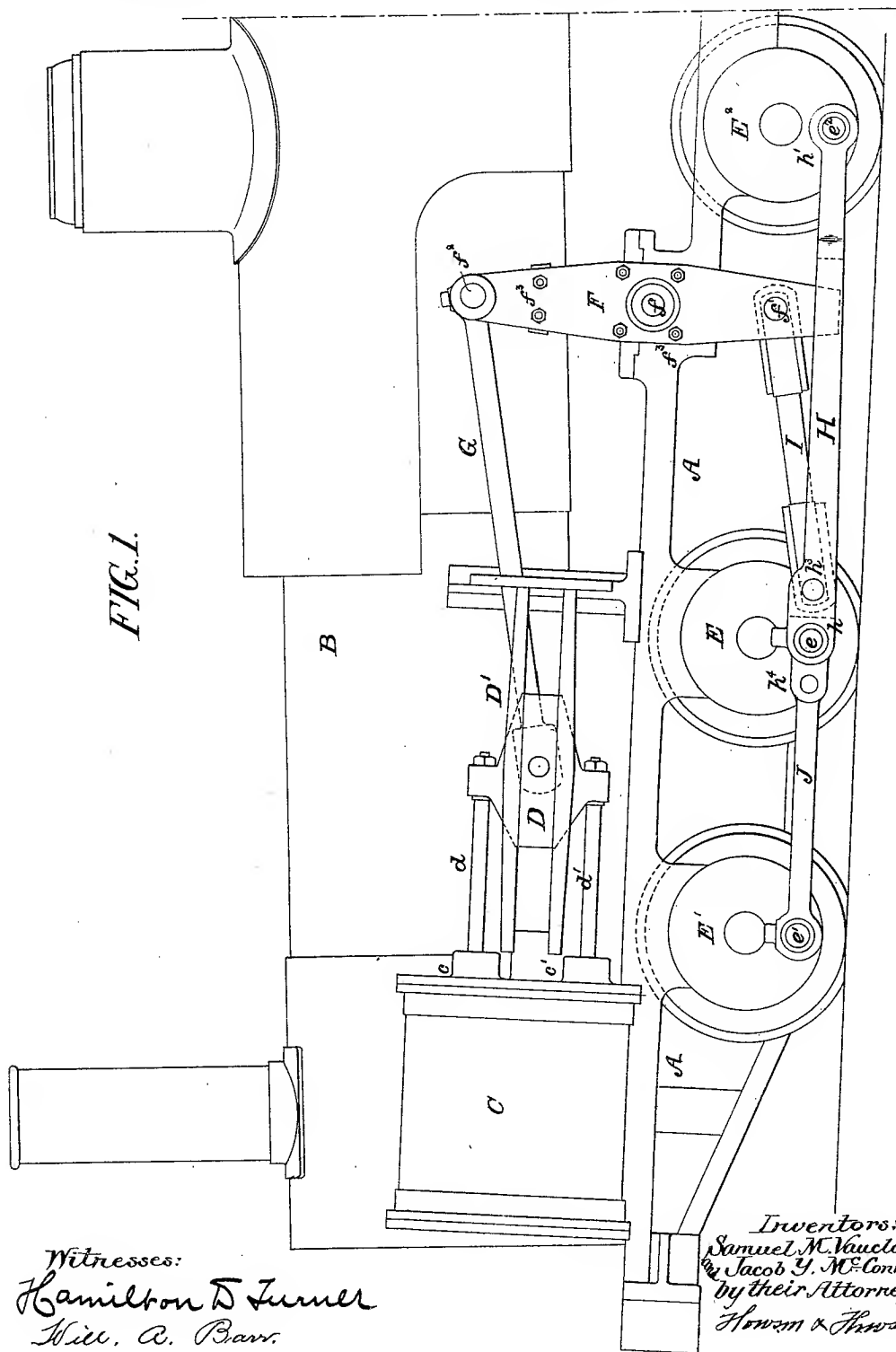
S. M. VAUCLAIN & J. Y. McCONNELL.

LOCOMOTIVE.

No. 600,102.

Patented Mar. 1, 1898.

FIG. 1.



Witnesses:  
Hamilton D. Turner  
Will. A. Barr.

Inventors:  
Samuel M. Vaclair  
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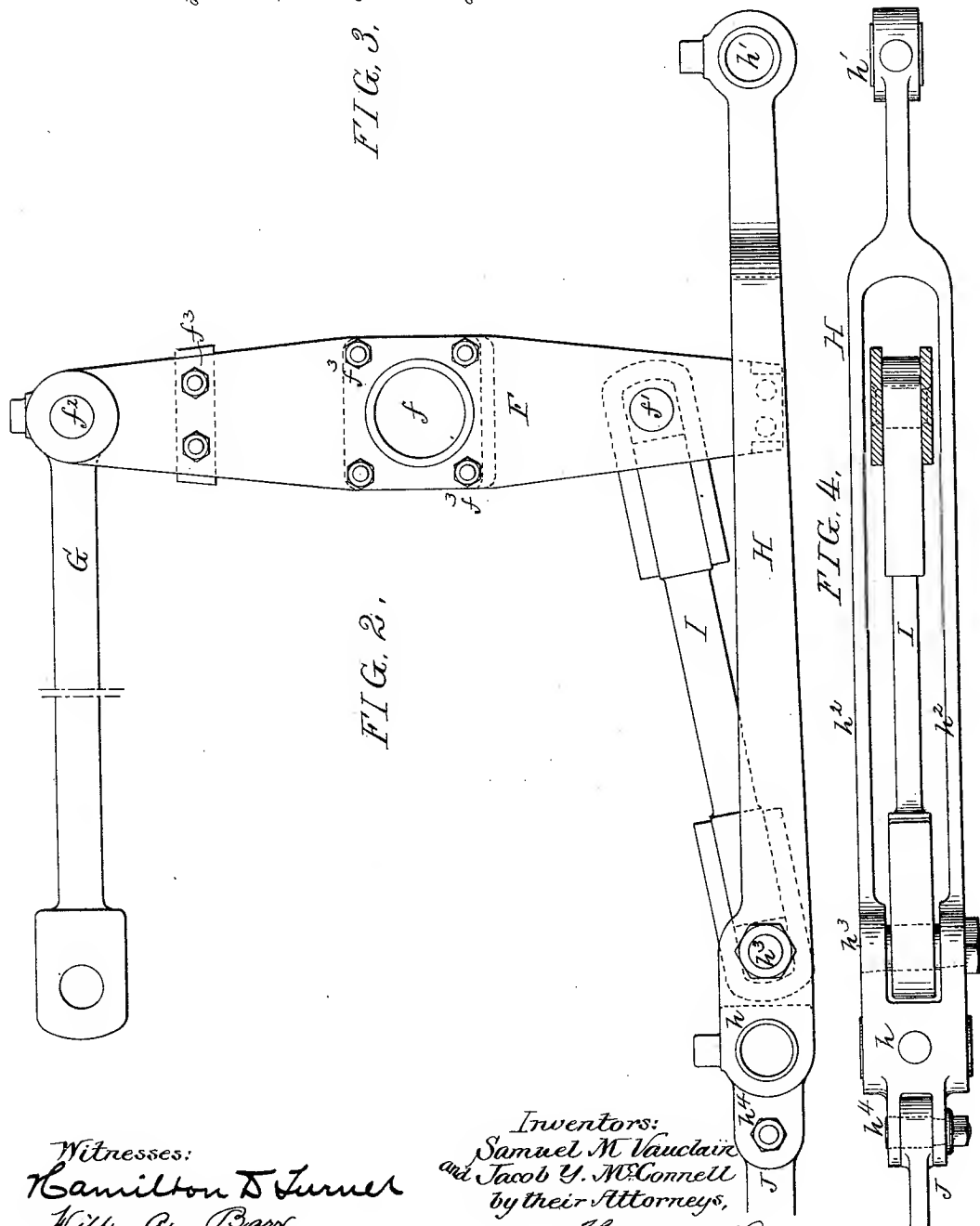
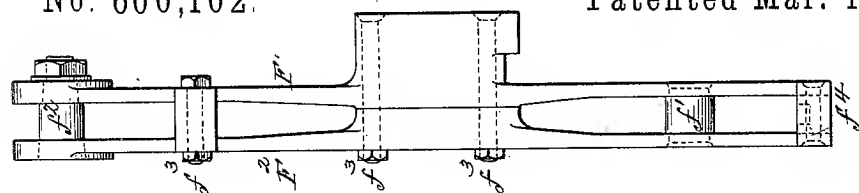
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2 Sheets—Sheet 2.

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No. 600,102.

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# UNITED STATES PATENT OFFICE.

SAMUEL M. VAUCLAIN, OF PHILADELPHIA, AND JACOB Y. McCONNELL, OF DARBY, PENNSYLVANIA.

## LOCOMOTIVE.

SPECIFICATION forming part of Letters Patent No. 600,102, dated March 1, 1898.

Application filed March 8, 1897. Serial No. 626,473. (No model.)

*To all whom it may concern:*

Be it known that we, SAMUEL M. VAUCLAIN, of Philadelphia, and JACOB Y. McCONNELL, of Darby, Pennsylvania, citizens of the United States, have invented certain Improvements in Locomotives, of which the following is a specification.

The object of our invention is to so construct the connecting mechanism between the cross-head and the driving-wheel of a locomotive that the strains will be taken centrally by the several elements, as fully described hereinafter.

Our invention is especially applicable to combined rack and adhesion locomotives used on inclined planes.

In the accompanying drawings, Figure 1 is a view of a portion of a combined rack and adhesion locomotive, illustrating our improvements. Fig. 2 is an enlarged detail view of the connecting-rods and levers. Fig. 3 is a side view of the lever, and Fig. 4 is a plan view of the parallel and intermediate rods.

By our invention we are enabled to couple the cross-head of the piston rod or rods to the wheels in such a manner that the line of strain from the cross-head to the crank-pins on the wheels will be on a center line, avoiding all overhanging joints, and consequently side strains.

A is the frame of a locomotive.

B is the boiler.

C is a cylinder-casing, in the present instance of the compound type, having two cylinders  $c$   $c'$ .

$d$   $d'$  are the piston-rods, connected to the cross-head D, sliding in ways  $D'$ .

$E$   $E'$   $E''$  are the three driving-axes, mounted in suitable bearing-boxes, and on each axle are disks having crank-pins  $e$   $e'$   $e''$ , respectively. The axles also have adhesion-wheels as well as rack-wheels.

Pivoted at  $f$  to a bearing on the frame of the locomotive is a two-armed lever F. Connecting the upper arm of this lever to the cross-head D is a rod G, so that the lever is vibrated on its pivot as the cross-head is reciprocated.

H is a parallel rod connecting the crank-pin  $e$  of the axle E with the crank-pin  $e''$  of the axle  $E''$ . As shown in Fig. 4, this parallel

rod is in the form of an elongated yoke open at the center and closed at each end, forming heads  $h$   $h'$  and side bars  $h''$ . In the forward end of this connecting-rod is a pivot-pin  $h''$ , to which is connected the intermediate rod I, which is also connected to a pivot-pin  $f'$  in the lower arm of the lever F. This lever F is made in the form of an open frame, being in the present instance constructed of two members  $F'$   $F''$ , bolted together by suitable bolts  $f''$  and the pins  $f'$   $f''$  and block  $f'''$ , so that the connecting-rod G and the intermediate rod I are mounted on the pins  $f''$   $f'$ , respectively, one directly below the other on the center line of strain.

The lower arm of the lever F extends between the bars  $h''$  of the parallel rod H, although in some instances it may terminate directly below the pivot-pin  $f'$ . The parallel rod J is connected to a pivot-pin  $h''$  on a forward extension of the rod H and to the crank-pin  $e'$  of the axle  $E'$ . This rod is also on the center line of strain, as clearly shown in Fig. 4.

On the axles  $E$   $E'$  may be mounted the rack-wheels when the locomotive is to be provided for use in connection with a rack; but we have not shown the details of the rack mechanism, as it does not form a part of this invention.

The connecting mechanism may be used with an ordinary adhesion-locomotive or with a locomotive having a combined adhesion and rack gear or the rack mechanism alone.

We claim as our invention—

1. The combination in a locomotive, of a cross-head, driving-axles, cranks therefor, a pivoted lever, a rod connecting the cross-head to the lever, a parallel rod connecting the cranks, and a rod coupled to the lever and imparting motion to the cranks, all of said connections being on a central line of strain, substantially as described.

2. The combination in a locomotive, of the cross-head, a pivoted lever, a rod connecting the cross-head to one arm of the lever, the driving-axle, cranks thereon, a yoked parallel rod connecting the cranks, an intermediate rod mounted within the yoke and connected to the lever, substantially as described.

3. The combination in a locomotive, of the cross-head, a pivoted lever forked at each end, a rod coupled to the cross-head and coupled

to the lever within one fork, the driving-axles, a yoked parallel rod connecting the driving-axles, an intermediate rod, one end of said rod being mounted within the yoke of the parallel rod and the other end being mounted within the fork of the lever so that the connection between the cross-head and the crank-pins of the driving-axles will be on a central line of strain, substantially as described.

4. The combination in a locomotive, of the frame, a two-armed lever pivoted thereto, each arm being forked, a cross-head, a rod connecting the cross-head to one arm of the lever, said rod being mounted between the forks, the three driving-axles, the two parallel rods H and J, the parallel rod H having an open center, an intermediate rod mounted within the opening and connected at one end to the said rod, the other end of the rod being mounted between the forks of the lever F and pivoted thereto, the rod J connected to the crank-pin of one axle and to a forward extension of the rod H and the whole arranged on the central line of strain, substantially as described.

5. The combination in a locomotive, of the

cross-head, the connecting-rod G, the intermediate rod I with a two-armed lever F pivoted to the frame of the locomotive, said lever being made up of two members  $F'$ ,  $F''$  suitably spaced and secured together, pivots  $f'$ ,  $f''$  extending from one member to the other, one pivot being for the rod G and the other pivot for the rod I, substantially as described.

6. The combination in a locomotive, of the cross-head, a connecting-rod G, a double-forked lever F pivoted to the frame of the locomotive, driving-axles, cranks therefor, a yoked parallel rod connected to the cranks of the wheels, an intermediate rod I coupled to the lever F and to the rod within the yoke, the end of one arm of the lever also extending within the yoke, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

SAMUEL M. VAUCLAIN.  
JACOB Y. McCONNELL.

Witnesses:

GEO. H. SIMPKINS,  
JUSTUS JOHNSON.